MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2022/2023

DME 5166 – Introduction to CAD / CAM

(Diploma in Mechanical Engineering)

5 OCTOBER 2023
9.00 a.m. – 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of **FOUR** pages excluding the cover page with **FOUR** Questions only.

2. Attempt all **FOUR** questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please write all your answers in the Answer Booklet provided.

Question 1

a) Your organization has just secured a project to develop an electric vehicle (EV) car. Therefore, you are tasked to lead a group of engineers to complete this project. Before you can delegate the task to your group members, you must plan all the crucial steps which need to be carried out before developing the EV car which will be a prototype. In the light of your geometric modeling knowledge, illustrate the **THREE** necessary steps which you will undertake in developing the prototype EV car. You may provide neat sketches with explanations to support your answers.

[15 marks]

b) Based on **Figure Q1(b)**, illustrate why is it important to define a 'datum' in geometric modelling. State what could possibly go ***'wrong'*** **OR** ***'right'*** if there is no datum defined to a part drawing. **[10 marks]**

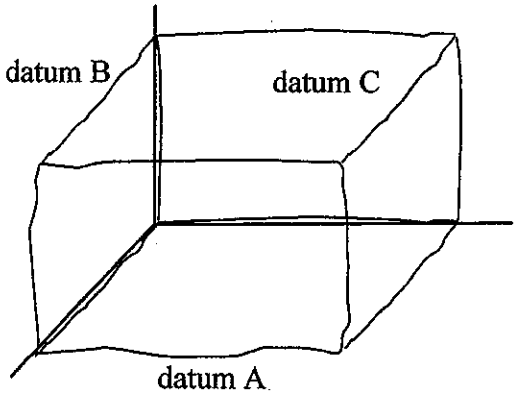

Figure Q1(b)

Continued...

Question 2

a) One of your clients has requested a detailed prototype of a human skeleton model. Assuming the cost to produce the prototype is not an issue, the investor requested that the prototype to be presented in an accurate manner with the detail features easily seen by the human eyes. Hence, propose **ONE** Rapid Prototype (RP) technique that you will use to fabricate your prototype. Explain why you had selected the RP technique over the others and give brief points on its basic key strengths and its schematic diagram. You may assume that all the RP techniques are available within your organization.

[15 marks]

b) With the aid of a neat sketch and correct labelling, illustrate '***layer-by-layer***' fabrication during a RP modelling. **[10 marks]**

Continued...

Question 3

a) **Figure Q3(a)** shows a turret of a CNC machine. By analyzing the figure, write the respective CNC codes for the different cutting tools shown as below:

i) Call cutting tool 'A' **[3 marks]**

ii) Call cutting tool 'B' **[3 marks]**

iii) Call cutting tool 'C' **[3 marks]**

iv) Call cutting tool 'D' **[3 marks]**

v) Call cutting tool 'E' **[3 marks]**

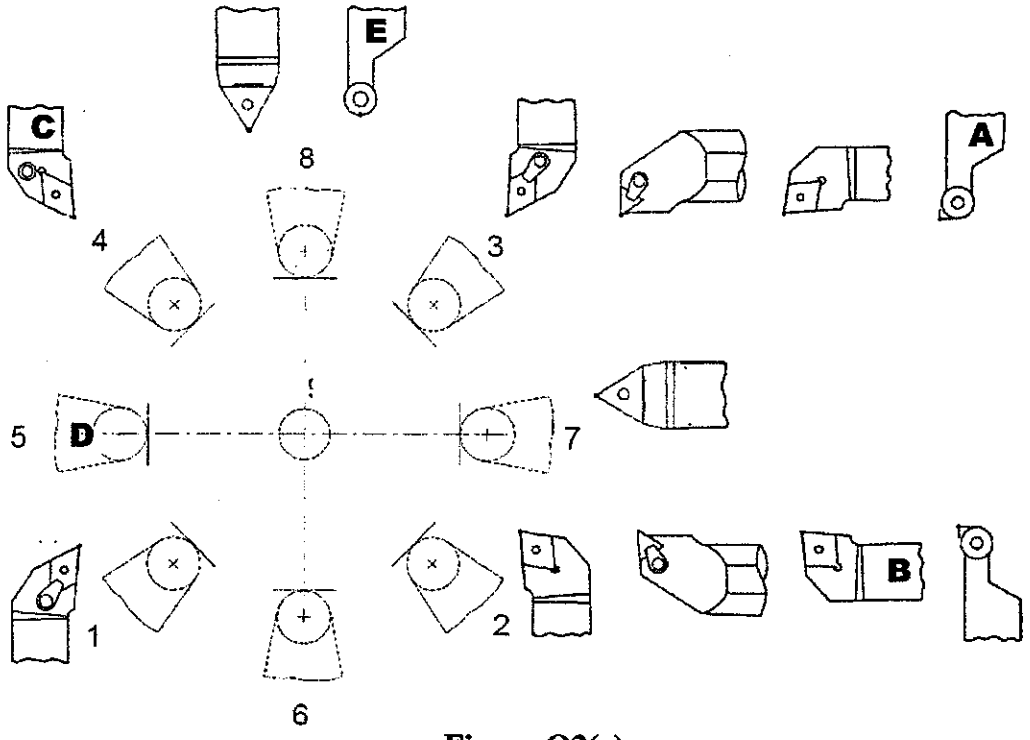

Figure Q3(a)

b) By means of a neat sketch, show how a turning operation is carried out using the following operations:

i) Parting **[2 Marks]**

ii) Back Turning **[2 Marks]**

iii) Threading **[2 Marks]**

iv) Grooving **[2 Marks]**

v) External Turning **[2 Marks]**

Continued...

Question 4

a) By means of a neat sketch and correct labelling, illustrate a typical setup in a warehouse using the **Flexible Manufacturing System** (FMS). **[15 marks]**

b) Robots play a huge role in a typical FMS. Differentiate the **FIVE** different components of a robot with their brief working characteristics.

(Note: You may support your answer by means of a neat sketch with correct labelling) **[10 marks]**

End of Paper